

P. 197

#29. a) $\vec{p} = m\vec{v}$
 $p = (0.250\text{ kg})(46.1\text{ m/s})$
 $p = 11.5\text{ kg}\cdot\text{m/s}$ $\therefore 3.6$

b) $p = 7.6 \times 10^6\text{ kg} \times 125\text{ km/h}$
 $\star = 9.4 \times 10^8\text{ kg}\cdot\text{km/h}$
 $\star = 2.6 \times 10^8\text{ kg}\cdot\text{m/s}$ $\therefore 3.6$

c) $p = 4.00 \times 10^5\text{ kg} \times 755\text{ km/h}$
 $\star = 3.02 \times 10^8\text{ kg}\cdot\text{km/h}$
 $\star = 8.3 \times 10^7\text{ kg}\cdot\text{m/s}$

d) $p = 9.11 \times 10^{-31} \times 6.45 \times 10^6$
 $9.11 \boxed{\text{Exp}}^{-31} \times 6.4 \boxed{\text{Exp}}^6$
 $= 5.88 \times 10^{-24}\text{ kg}\cdot\text{m/s}$

30. $F = -2125 \text{ N}$

$t = 0.0205 \text{ s}$

$$\vec{J} = F \Delta t$$

$$= -2125 \text{ N} \times 0.0205 \text{ s}$$

$$= -43.6 \text{ Ns}$$

31. $F = 1.23 \times 10^7 \text{ N}$

$t = 21.0 \text{ ms} \div 1000 = 0.0210 \text{ s}$

$$\vec{J} = F \Delta t$$

$$= 1.23 \times 10^7 \text{ N} \times 0.0210 \text{ s}$$

$$\Rightarrow = 2.583 \times 10^5 \text{ Ns}$$

32. $t = 57.1 \text{ ms}$
 $F =$

$$\vec{J} = F \Delta t$$

$$\frac{\vec{J}}{\Delta t} = F = \frac{2.583 \times 10^5 \text{ Ns}}{0.0571 \text{ s}}$$

$$= 4.52 \times 10^6 \text{ N}$$

33. $V = 43 \text{ m/s}$

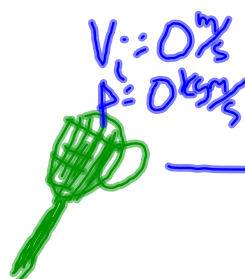
$$m = 0.060 \text{ kg}$$

\vec{J} = change in momentum

$$\vec{J} = m \Delta V$$

$$= 0.060 \text{ kg} (43 \text{ m/s} - 0 \text{ m/s})$$

$$= 2.58 \text{ kg m/s}$$



$$V_i = 0 \text{ m/s}$$
$$p_i = 0 \text{ kg m/s}$$

$$V_f = 43 \text{ m/s}$$
$$p = 0.060 \times 43$$



34. $m = 0.35 \text{ kg}$

$$V_i = 46 \text{ m/s}$$

$$V_f = -62 \text{ m/s}$$



$$\begin{aligned}\vec{J} &= m \Delta V \\ &= 0.35 \text{ kg} (-62 \text{ m/s} - 46 \text{ m/s}) \\ &= 0.35 \text{ kg} (-108 \text{ m/s}) \\ &= -38 \text{ kg m/s}\end{aligned}$$

$$35. m = 1.5 \text{ kg}$$

$$d = 1.75 \text{ m } x$$

$$\vec{J} = m \Delta v$$

$$g = -9.81 \text{ m/s}^2$$

$$v_i = 0 \text{ m/s}$$

$$v_f =$$



$$v_f^2 = v_i^2 + 2ad$$

$$v_f^2 = 0^2 + 2(-9.81)(-1.75)$$

$$= 5.9 \text{ m/s}$$

$$v_i = -5.9 \text{ m/s}$$

$$v_f = 0 \text{ m/s}$$

$$\vec{J} = 1.5 \text{ kg} \times (0 \text{ m/s} + 5.9 \text{ m/s})$$

$$= 8.8 \text{ kg m/s}$$

P. 315.

$$\begin{aligned} 25. \quad m_H &= 47 \text{ kg} \\ m_C &= 72 \text{ kg} \\ V_H &= 2.2 \text{ m/s} \\ V_C &= 3.1 \text{ m/s} \end{aligned}$$

$$\vec{P}_{\text{BEFORE}} = \vec{P}'_{\text{AFTER}}$$

$$\begin{aligned} m_H V_H + m_C V_C &= (m_C + m_H) V_{\text{BOTH}} \\ \underline{103.4 \text{ kgm/s} + 223.2 \text{ kgm/s}} &= \underline{(119 \text{ kg})} V_{\text{BOTH}} \\ 119 \text{ kg} & \\ V_{\text{BOTH}} &= 2.7 \text{ m/s} \end{aligned}$$